

Part 2: Group Work**Group Questions: USE A SEPARATE SHEET AS NEEDED**

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: The energy an object has stored up in it.

Kinetic energy: The energy of motion.

(k/p) *Gravitational energy:* The energy created by gravity acting on an object. ^{from another object.} ~~Energy of matter,~~

(k) *Thermal energy:* The energy related to heat and phase changes

(k/p) *Chemical energy:* The energy related to changes in matter/ the form of molecules.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Energy would change and move quicker. (Increase). There would be more evaporation, which would mean more water would condense, which would mean there would be more precipitation.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Potential gravitational energy would increase because there would be less evaporation, leading to more water in the ground sitting.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

First, clouds would begin to disappear. Then, infiltration and runoff would stop, because all water would be flowing to lakes or oceans. Finally, all water would just sit in oceans.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

Gravitational energy would stay the same. Since water would be cooler, it would evaporate less, therefore increasing potential and decreasing thermal and chemical kinetic.

forming bonds releases heat

ISP203A – Global Change, Energy

Part 2: Group Work

GROUP #: Y

1/27/11

Student IDs of Members Present:

██████ A35919773

██████ A40491423

██████ A42837704

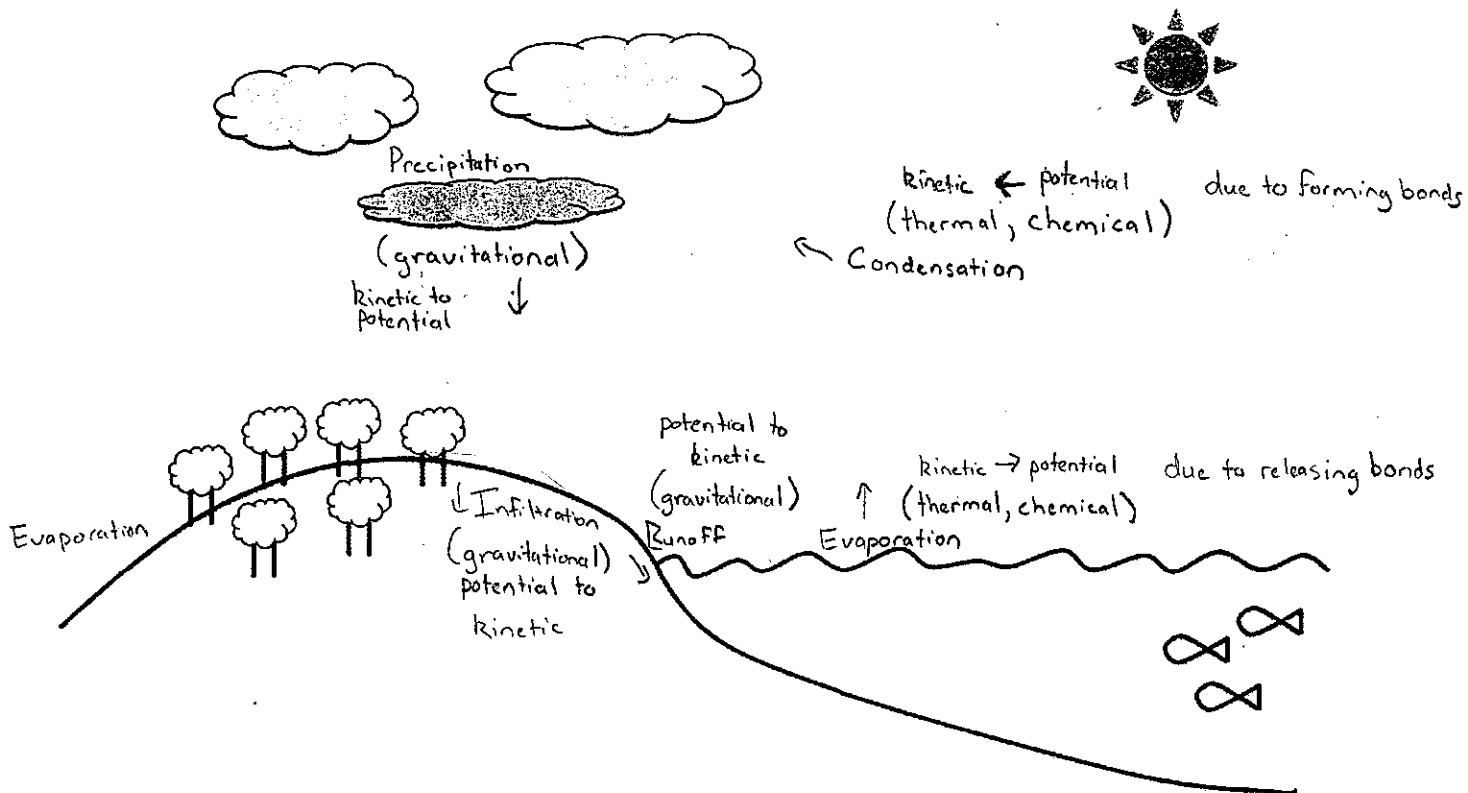
██████ A37417357

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

2. Cloud raining

Gravitational kinetic → Gravitational potential

3. Water (surface) going to groundwater

Gravitational potential → Gravitational kinetic

4. Groundwater running off to lakes & streams.

Gravitational potential → Gravitational kinetic

5. Water evaporating

Thermal kinetic → Chemical Potential

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: *Stored energy*

Kinetic energy: *Energy in motion*

Gravitational energy: *force that pulls objects together*

Thermal energy: *Heat Energy*

Chemical energy: *Energy from molecule & atom arrangements*

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

An increase in thermal kinetic energy will lead to more evaporation. This will lead to more condensation and precipitation.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Molecules would move slower lower the temperature and lead to less condensation and precipitation. and less gravitational energy.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

This would create fewer molecules in the atmosphere.

This would lead to less condensation and precipitation.

And less gravitational^{pot.} energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

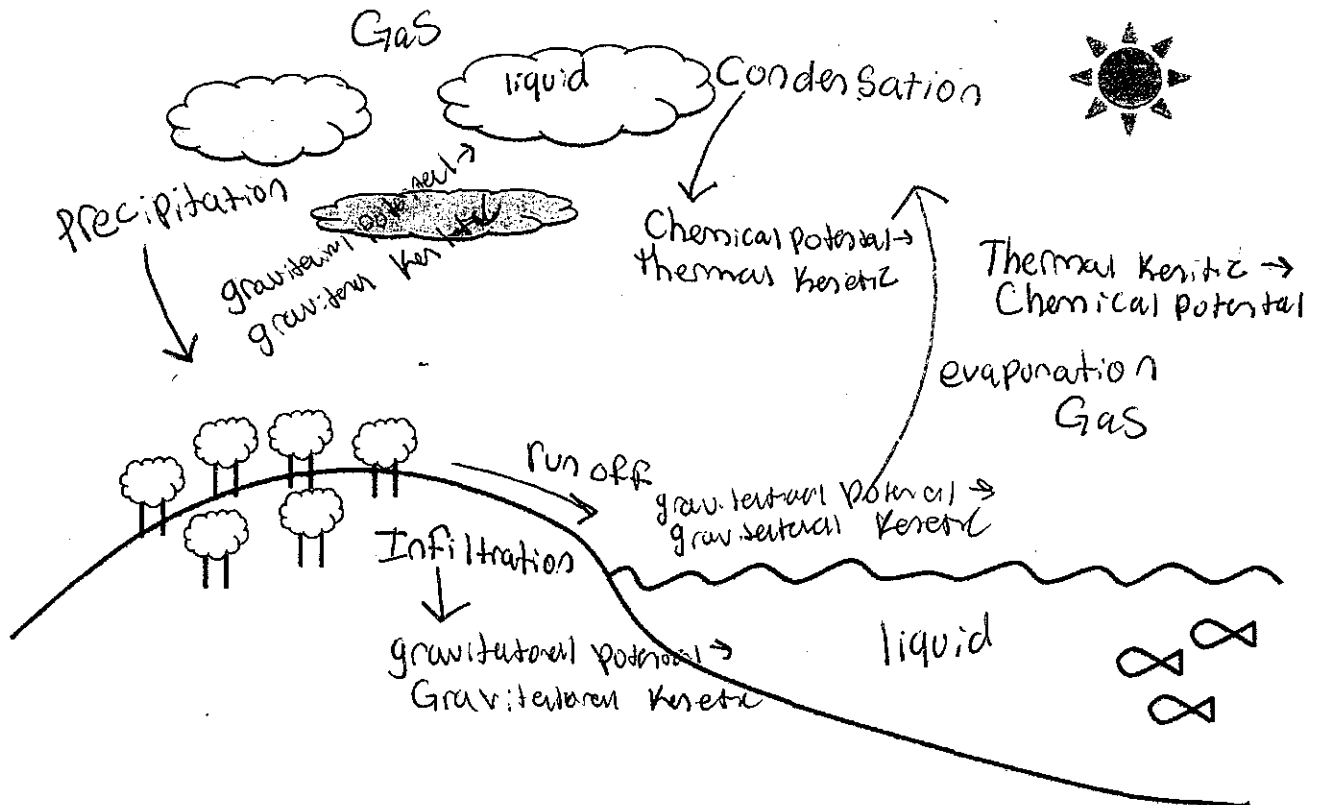
This would lead to larger reservoirs and that leads to more evaporation and condensation. This would lead to an increase in chem. potential and thermal energy. It would also lead to more gravitational energy due to the increase of precipitation.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

~~Water~~

Infiltration

gravitational potential → gravitational kinetic

Runoff

gravitational potential → gravitational kinetic

Evaporation

Thermal kinetic → chem. potential

Condensation

chem. potential → thermal kinetic

Precipitation

gravitational potential → gravitational kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: moved energy

Gravitational energy: draws objects together

Thermal energy: heat energy of movement

Chemical energy: energy during the changing of molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

molecules will be moving faster because of the heat.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Less precipitation because there is less evaporation happening

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

evaporation stops less condensation
↳ less precipitation

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

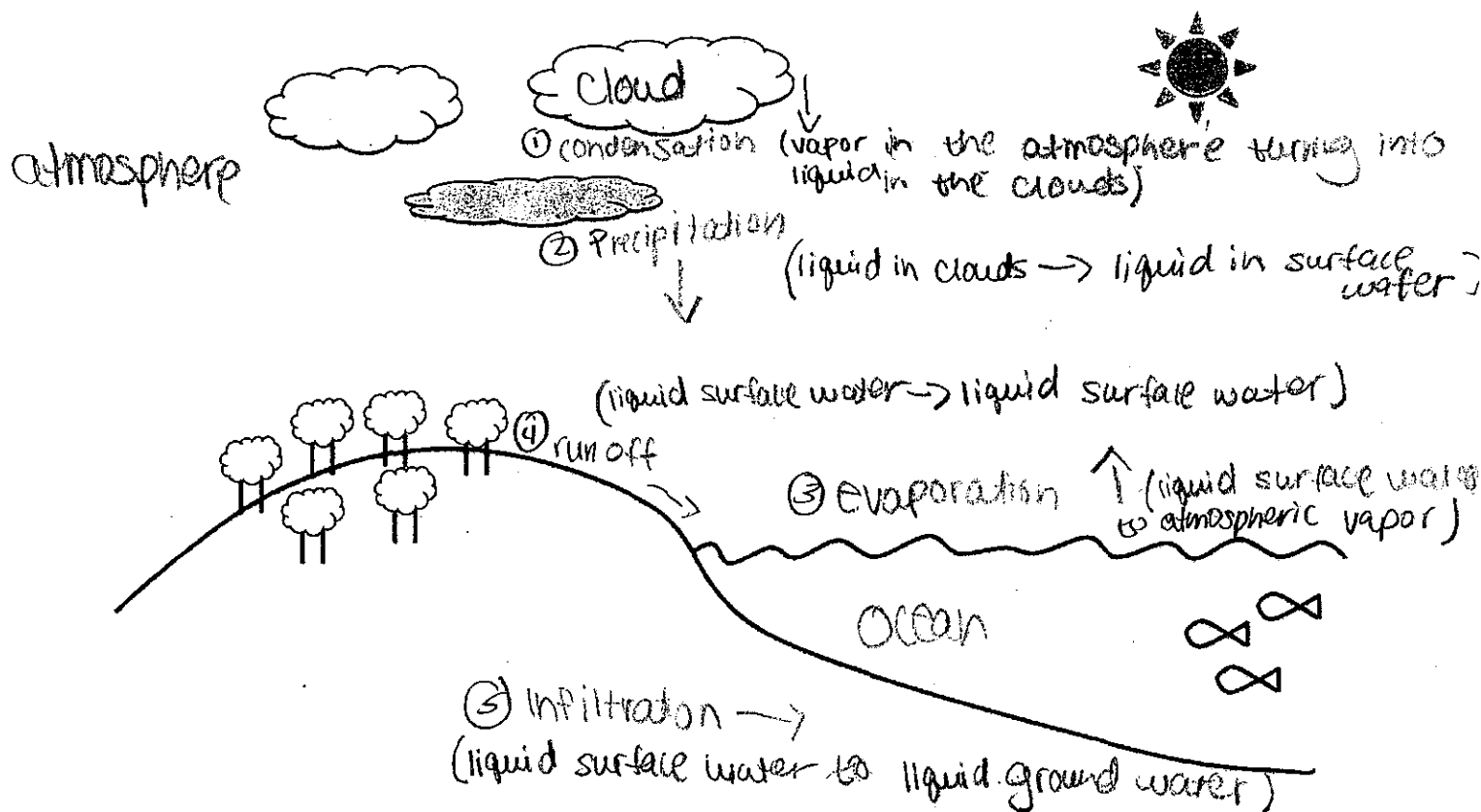
less vapor in the air the only part of the water cycle that would exist is the surface area.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:
1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

- ① condensation: chemical potential \rightarrow thermal
- ② precipitation: gravitational potential \rightarrow gravitational kinetic
- ③ evaporation: thermal kinetic \rightarrow chemical potential
- ④ run-off: gravitational kinetic \rightarrow gravitational kinetic
- ⑤ infiltration: gravitational kinetic \rightarrow gravitational potential

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: energy of motion

Gravitational energy: energy of objects with mass drawn together

Thermal energy: energy that results from movement of molecules

Chemical energy: energy from the arrangement of molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

There would be an increase in evaporation, which would cause more water in the atmosphere. 1.0

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

There would be more condensation, causing more clouds to form in the atmosphere. More clouds means an increase in gravitational potential energy causing more precipitation.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stops there would be less water vapor in the atmosphere. condensation would increase then eventually stop. the ~~for~~ atmosphere would be really HOT and then could because of thermal energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

There wouldn't be much evaporation, thermal potential energy would be lacking because the water is cold

ISP203A – Global Change, Energy
Part 2: Group Work

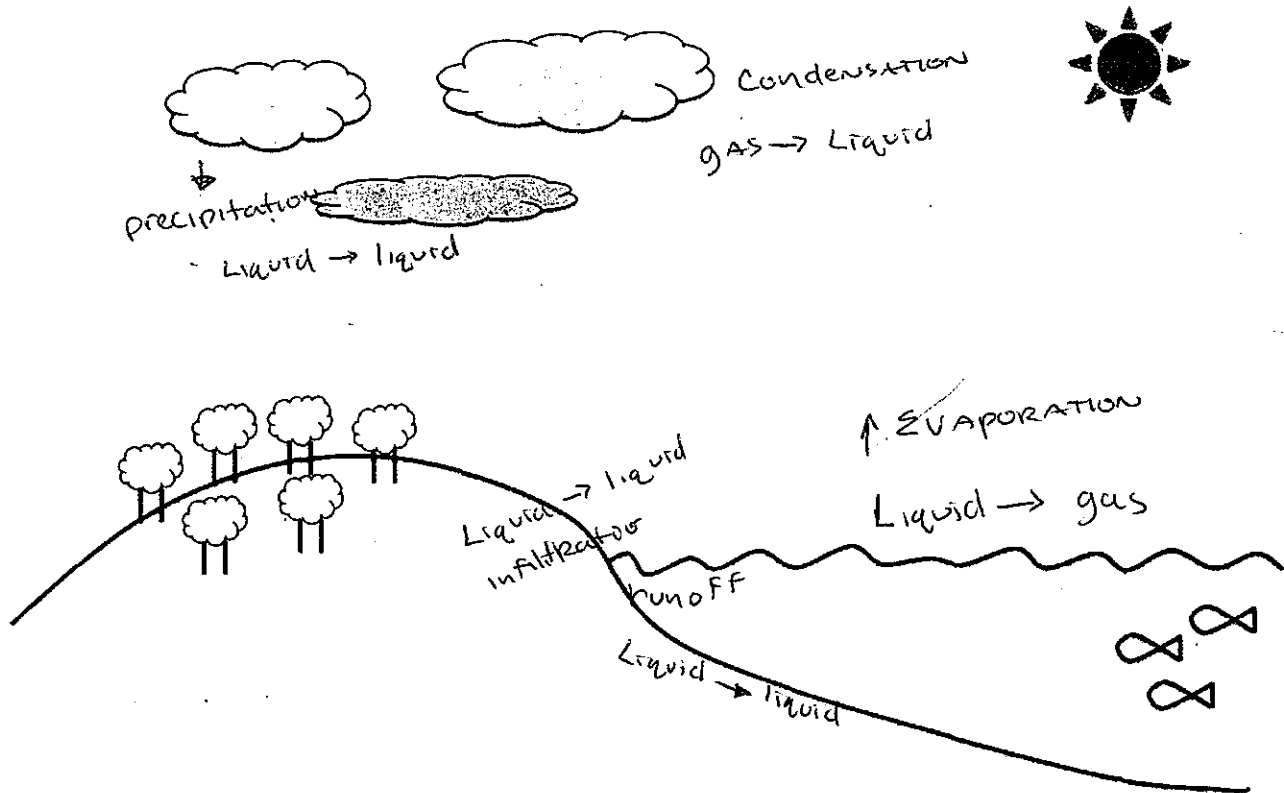
GROUP #: 5
Student IDs of Members Present:
A39127449
A43292970
A43356550
A43294133

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

2. lake water turning into a gas (evaporation)

Thermal kinetic → chemical potential

3. liquid water from cloud to surface

gravitational kinetic → gravitational potential

4. ~~ground~~ surface water → ground water

gravitational potential → gravitational kinetic

5. surface water → body of water

gravitational potential → gravitational kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: Energy that is stored; energy an object could have

Kinetic energy: Energy an object has due to movement

Gravitational energy: Energy that brings objects together

Thermal energy: Energy an object has because of its temperature

Chemical energy: Energy related to the arrangement of atoms + molecules.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

This would change how energy is ~~dis~~ used by creating an increase in evaporation

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

This might affect the gravitational potential of water in the atmosphere by creating more clouds which would lead to cooler temperatures.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stopped the water cycle would stop & there would be no precipitation due to a lack of thermal kinetic energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

This would affect energy in the water cycle because it would be colder which leads to a lack of evaporation because we need thermal kinetic energy for evaporation.

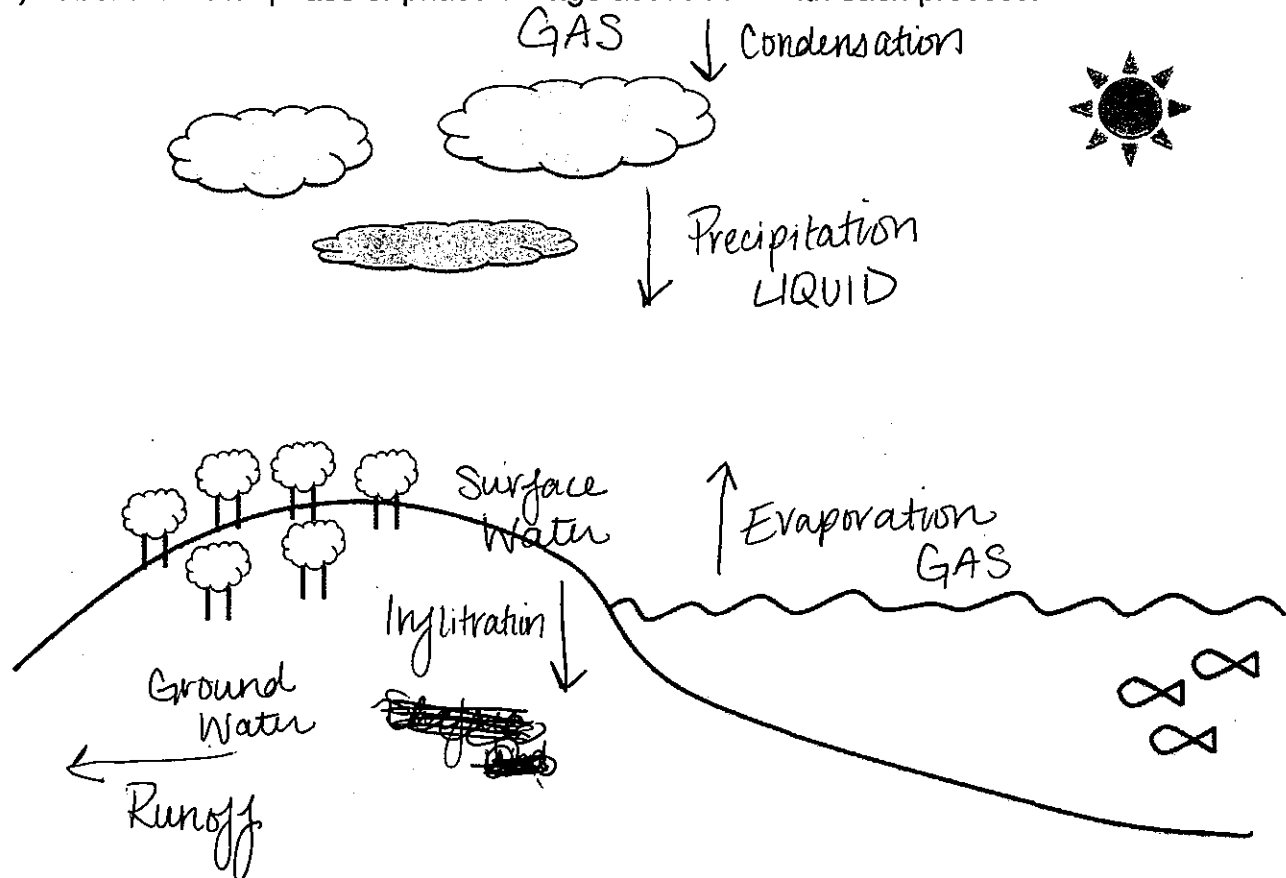
A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.

A41548166



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

2. Cloud turning into liquid

Gravitational Potential → Gravitational Kinetic

3. Liquid turns into a gas

Thermal Kinetic → Chemical Potential

4. Surface Water goes to Ground Water

Gravitational Potential → Gravitational Kinetic

5. Ground Water goes to runoff

Gravitational Potential → Gravitational Kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

~~Take a moment~~ for a moment: In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: energy of motion

Gravitational energy: attraction energy

Thermal energy: energy of heat

Chemical energy: energy of changing atoms/molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

more water would evaporate, water would take longer to condense.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

there would be less precipitation/ it would condense quicker.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

the whole water cycle would shut down, without one phase it would not continue.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

more thermal energy would be necessary for evaporation.

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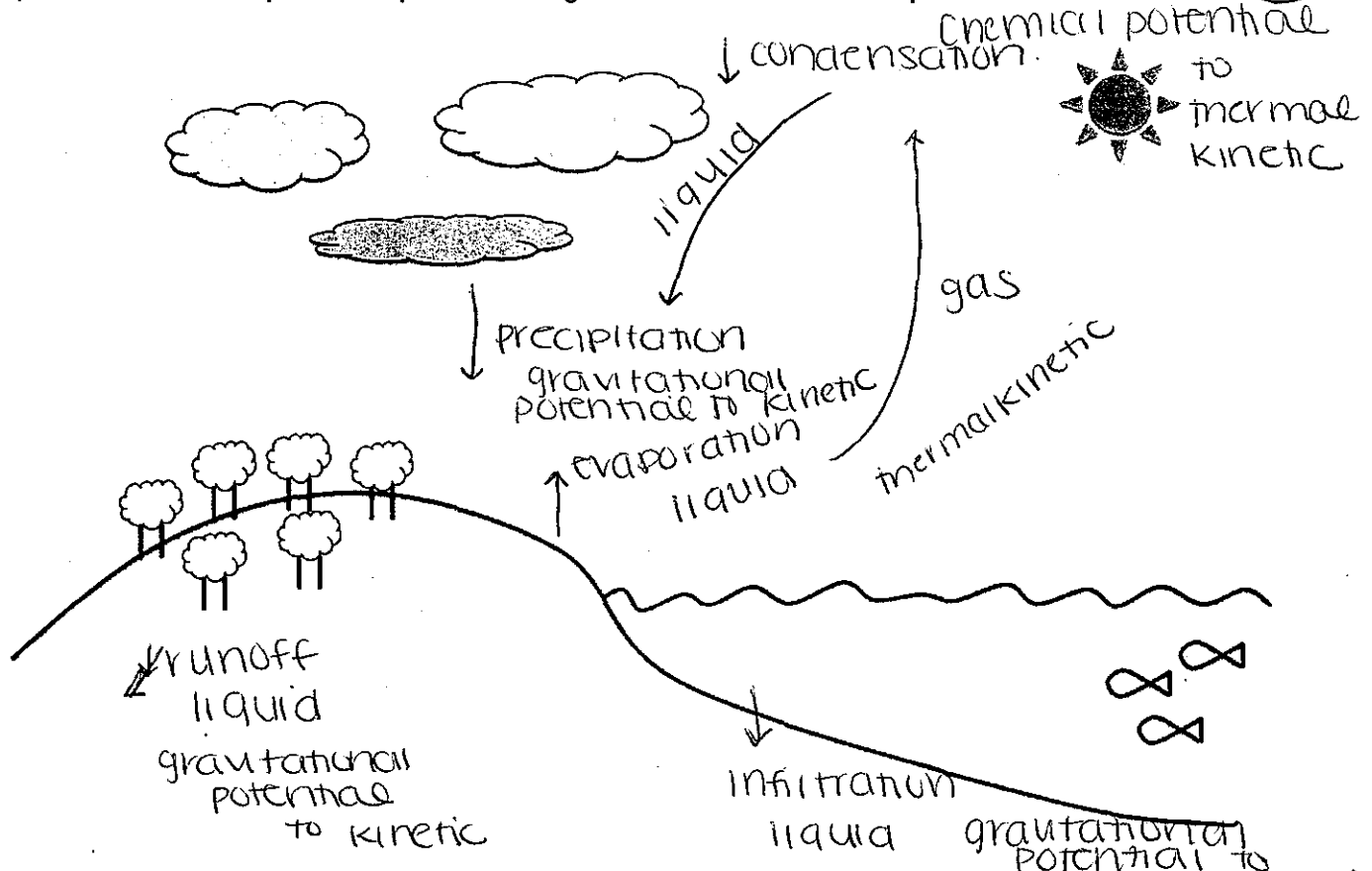
GROUP #: A43414990
Student IDs of Members Present:
 A43143418 [redacted]
 A43361991 [redacted]
 A43414990 [redacted]

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: Energy stored in matter.

Kinetic energy: Energy ~~caused by~~ ^{used in the} movement of molecules.

Gravitational energy: Energy between two objects.

Thermal energy: Energy caused by the movement of molecules.

Chemical energy: ~~Energy~~ Energy released or used in chemical reactions.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Less energy is used because less phase changes would occur.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

I don't think the thermal energy would affect the gravitational energy.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

Eventually the water cycle would end because the water has to be recycled. Without evaporation, no more condensation, no more precipitation.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

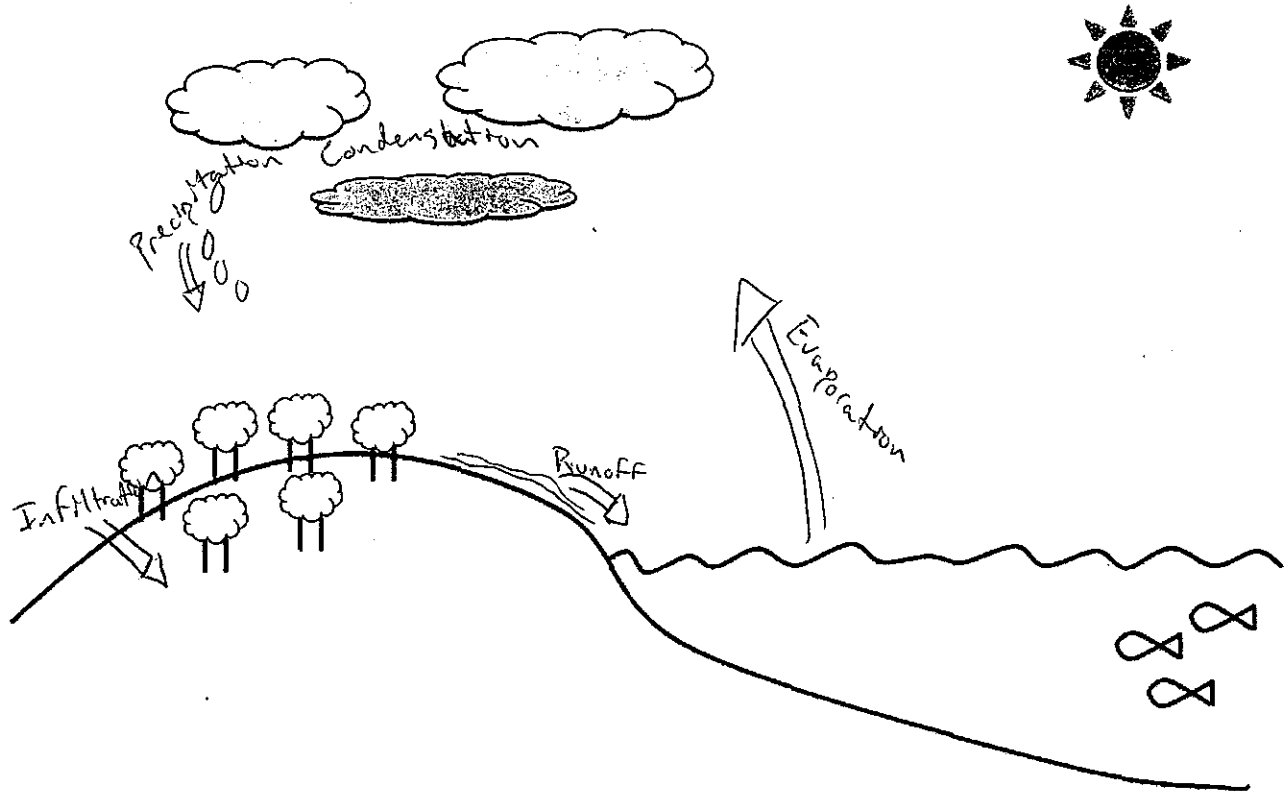
The water cycle would be slowed down.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

2. Water falling to the ground

Potential energy → Kinetic Energy / Gravitational Potential

3. Water Evaporating Into the air

Potential Energy → Chemical Energy (Phase Change)

4.

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy:

Kinetic energy:

Gravitational energy:

Thermal energy:

Chemical energy:

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

There will be more evaporation, that will form more clouds, and if the clouds are heavy enough, precipitation will occur.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

It may cause the water to freeze or less precipitation.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

Energy would slow down.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

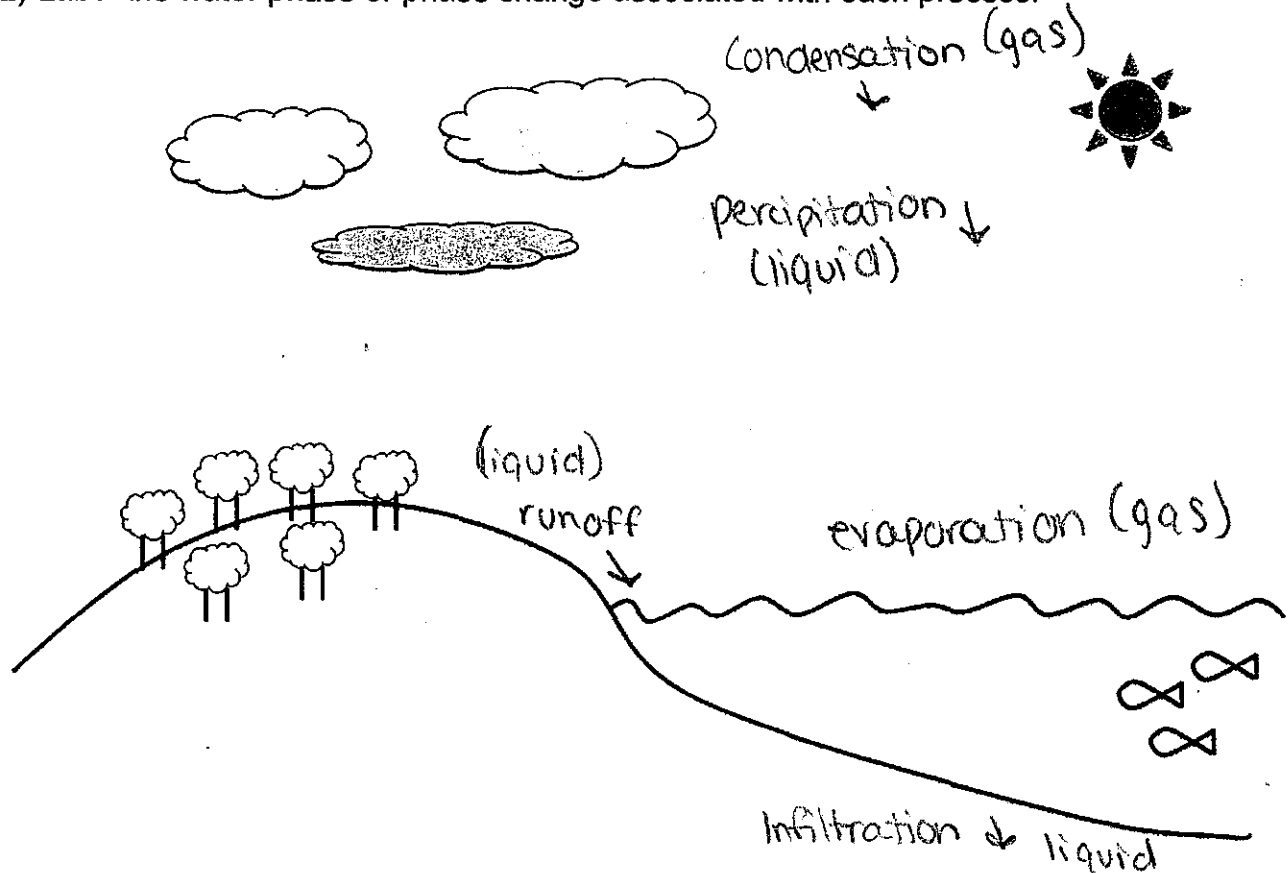
There would be more energy being used.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).
condensation.

2) evaporation- liquid turning into a gas

thermal kinetic → chemical energy potential

3) precipitation - liquid in the clouds to liquid in the ocean
gravitational potential → gravitational kinetic

4) runoff - liquid from the surface to liquid in the ocean
grav. potential → grav. kinetic

5) Infiltration - liquid from the surface to liquid in ground.
grav. potential → grav. kinetic.

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: ~~stored~~ energy

Kinetic energy: moving energy

Gravitational energy: energy that pulls objects together

Thermal energy: energy that is related to or caused by heat

Chemical energy: energy stored in molecules by virtue of the arrangement of atoms w/ the molecule.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

A increase in temperature would create more evaporation, less condensation which means less precipitation. It would be very humid.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Less thermal energy would mean less evaporation so less precipitation.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stopped there would be a build up of energy because evaporation outputs energy

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

There would be less thermal energy. Evaporation would take longer which would mean decreased flux rate, in turn increasing residency time.

ISP203A – Global Change, Energy
Part 2: Group Work

GROUP #: N
 Student IDs of Members Present:

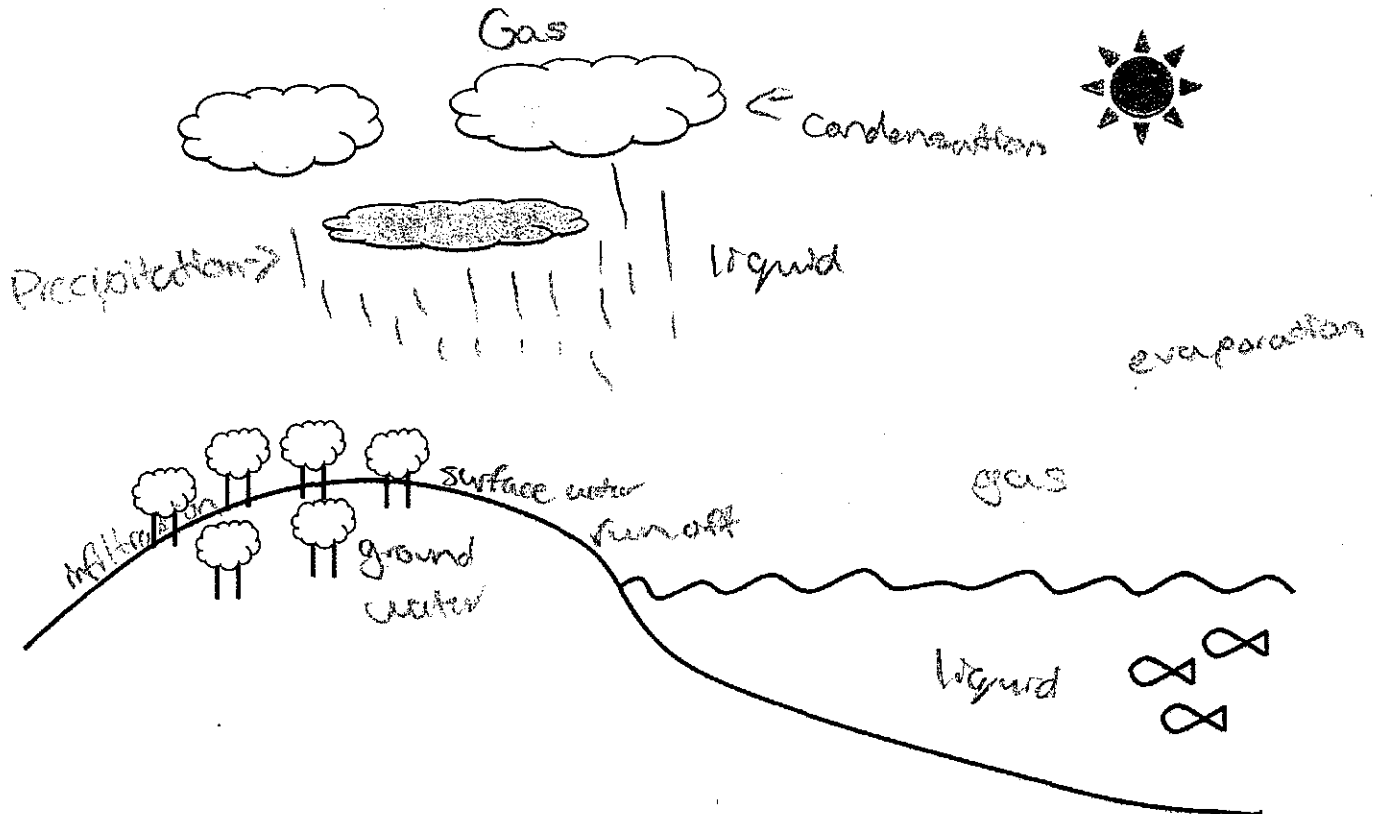
~~XXXXXXXXXX~~ A42664593
~~XXXXXXXXXX~~ A42833012
~~XXXXXXXXXX~~ A41107889
~~XXXXXXXXXX~~ A43637189

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. Liquid water falling to surface

Gravitational energy \rightarrow potential energy

3. Liquid water into ground

potential energy \rightarrow kinetic energy

4. ground water into lake

gravitational potential \rightarrow gravitational kinetic

5. liquid water into atmosphere

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: an object that has stored energy

Kinetic energy: energy of motion

Gravitational energy: mass/matter pulled/pushed to other mass/matter

Thermal energy: energy associated with the movement of molecules

Chemical energy: energy associated with breaking/forming bonds

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Warmer temperatures lead to more evaporation from surface waters; more surface water from melting glaciers.

More thermal kinetic because as the water changes form there is less stored energy (therm. pot)

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Decrease in therm. energy would increase condensation, which would increase grav. pot energy in atmosphere.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

Thermal pot. energy^{and chemical, kinetic} would decrease. Water would gather in low spots and remain, leading to an extreme decrease in gravitational kinetic energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

More thermal energy would be needed to evaporate the surface water.

ISP203A – Global Change, Energy
Part 2: Group Work

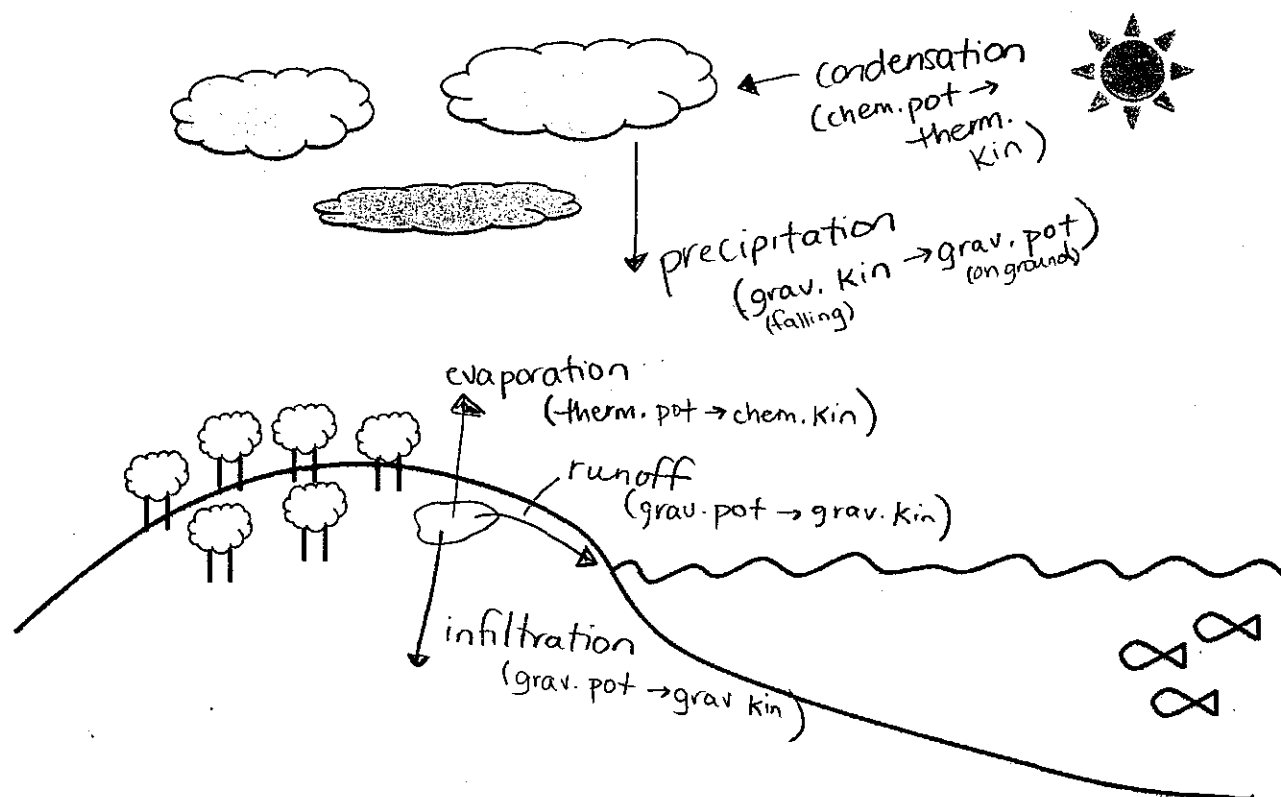
GROUP #: M
Student IDs of Members Present:
A34305310
A43915317
A42773599
A42383975

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

Part 2: Group Work

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A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: *stored energy*

Kinetic energy: *energy in motion*

Gravitational energy: ~~energy bet~~ *the pull of energy between two objects*

Thermal energy: *energy existing ^{between} objects in motion*

Chemical energy: ~~the energy~~ *energy due to the arrangement of molecules*

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Thermal-kinetic energy would increase evaporation causing an increase in the amount of water vapor in the air.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

There would be less evaporation and vapor in the air. Therefore there would be less gravitational potential of water.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

There would be a decrease in thermal and gravitational potential and kinetic energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

There would be less thermal-kinetic energy, thus less evaporation, condensation, and precipitation.

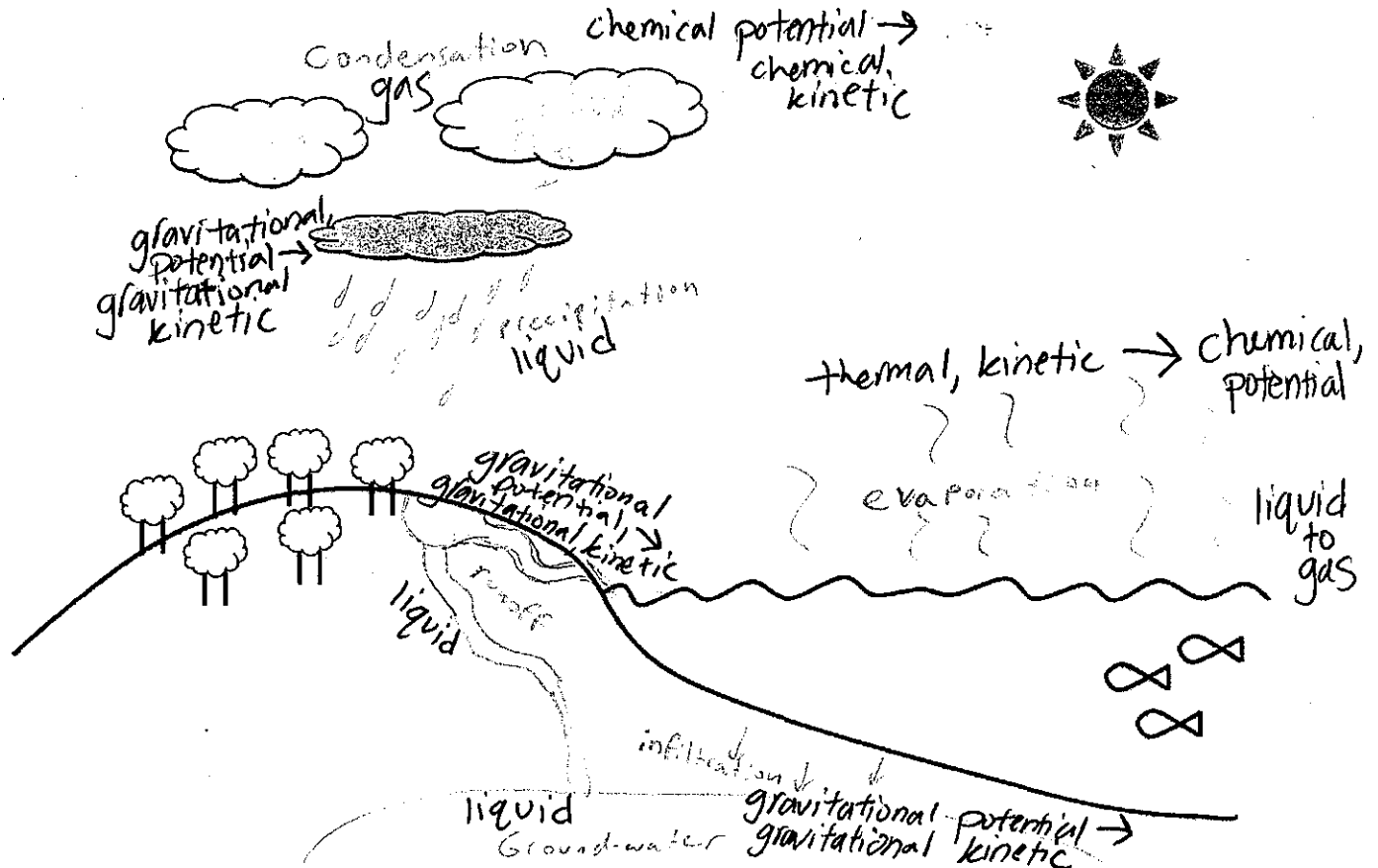
GROUP #: L
Student IDs of Members Present:
 AU2204525: K [REDACTED]
 A41439593: [REDACTED]
 A4206573: [REDACTED]

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: energy stored

Kinetic energy: energy of motion

Gravitational energy: energy that allows objects to come together

Thermal energy: energy from the movement of molecules

Chemical energy: energy from placement of atoms + molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

It would speed up the water cycle because the higher the temperature the faster molecules move. It would only speed up the evaporation/condensation ~~because~~ because they have thermal energy.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere.

Describe how this might affect the gravitational potential of water in the atmosphere.

There would be less water evaporating therefore less water in the clouds to cause condensation/precipitation so the water ~~cycle~~ cycle would slow down.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

There would be no water going up into the clouds/fresh water coming back so Earth would have the same amount of water except that humans/animals would deplete it.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

There would be less thermal energy and evaporation would take longer which would mean a decrease in flux rate.

Part 2: Group Work

GROUP #:

Student IDs of Members Present:

A43330797, A42627086

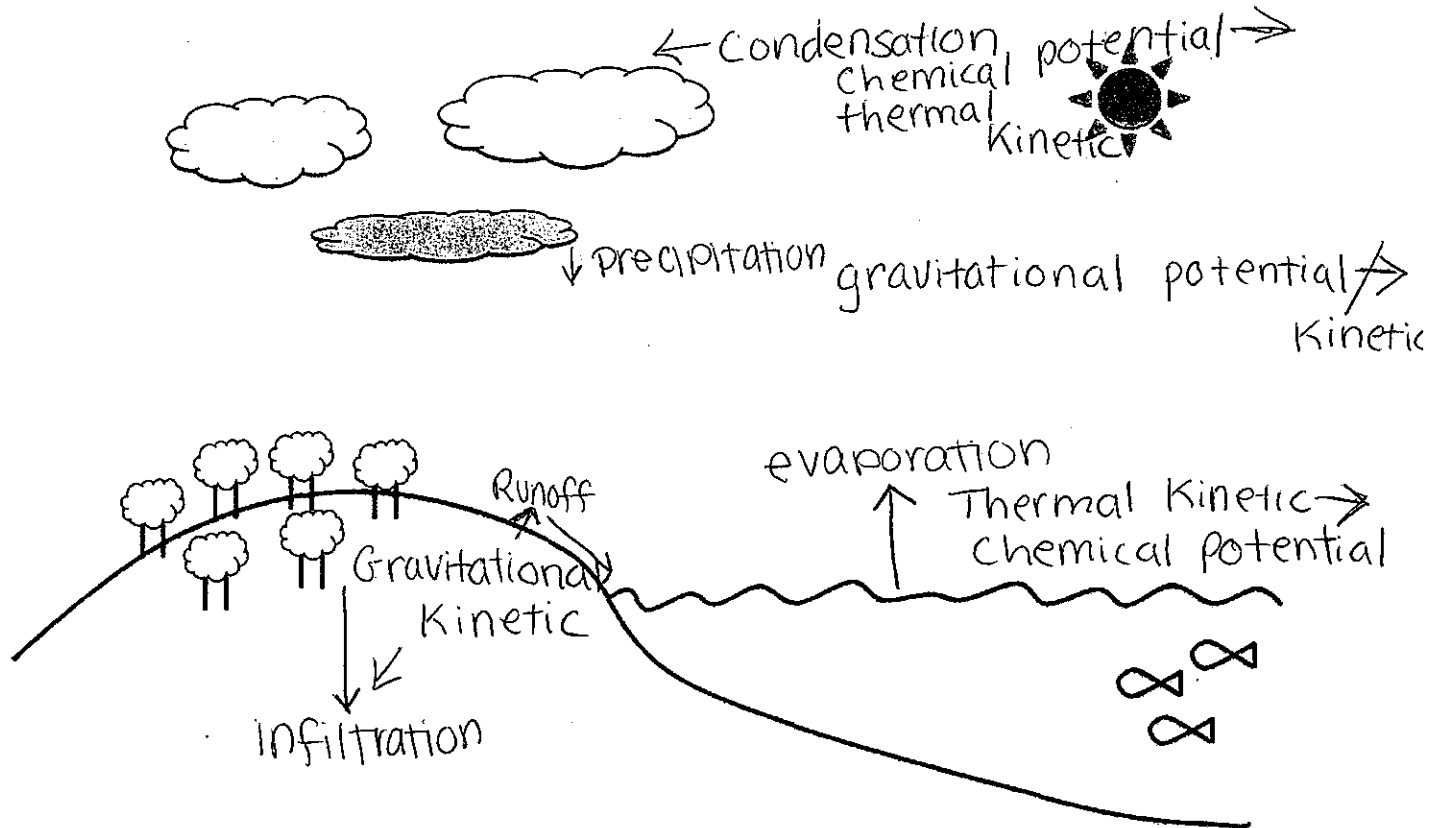
A40461394, A43682453

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. liquid water turning into vapor water

*Thermal kinetic \rightarrow chemical potential [evaporation]*3. H_2O in cloud into water on ground*~~chemical~~ potential \rightarrow ~~thermal~~ kinetic [precipitation/condensation]*4. H_2O on ground to H_2O in soil*Gravitational kinetic [infiltration]*5. H_2O in ~~ground~~ ^{ground} to H_2O in lake.*Gravitational kinetic [Runoff]*

6.

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: The energy stored in an object that can be used

Kinetic energy: The energy an object has while it moves

Gravitational energy: The energy that attracts 2 objects together

Thermal energy: The energy comes from how fast the molecules are moving

Chemical energy: atoms and molecules arrangement decides the energy (phase change possible)

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

To much water would evaporate and get trapped in the atmosphere because cooler temps are needed for condensation.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

There would be a lot less water evaporating into the atmosphere, so not nearly as much water that will have potential energy to rain, runoff, etc.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

The whole water cycle would break down.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

The water would take longer to evaporate if it is colder.

Part 2: Group Work**GROUP #:** J**Student IDs of Members Present:**

A433384416 A41069790

A42264860

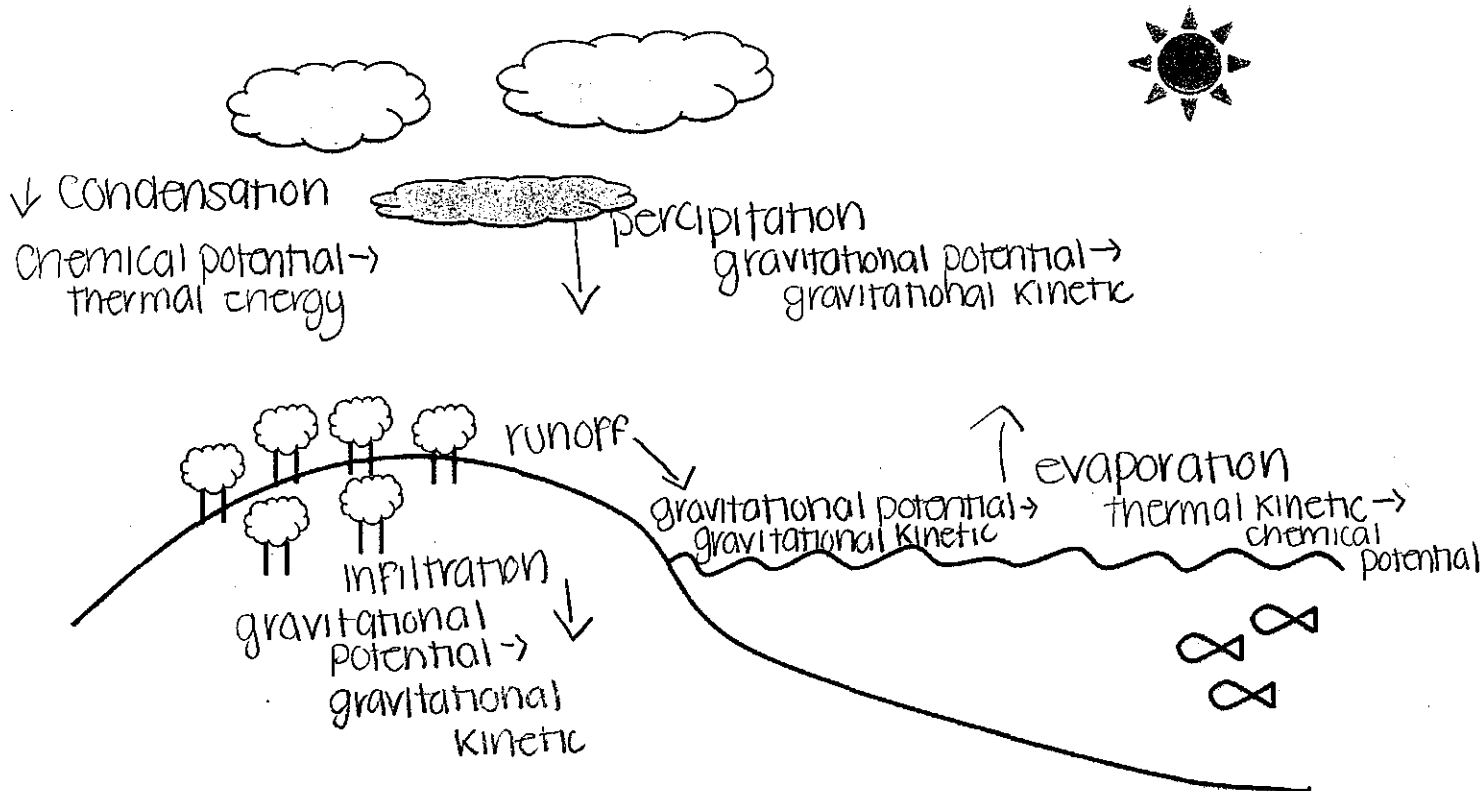
A48601758

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. Water from the lake evaporates into the atmosphere

thermal kinetic \rightarrow chemical potential

3. condensed liquid water falling from a cloud (in droplets)

gravitational potential \rightarrow gravitational kinetic

4. Water travels over hills and into the lake (rain)

gravitational potential \rightarrow gravitational kinetic

5. water gets soaked into soil

gravitational potential \rightarrow gravitational kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: energy in motion

Gravitational energy: energy that pulls two objects together

Thermal energy: energy of heat; average kinetic energy of molecules

Chemical energy: energy that results in the change/arrangement of atoms & molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

If global temperatures increased, the water cycle would utilize much more thermal energy from evaporation.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

If there was a decrease in thermal energy in the atmosphere, there would be an increase in gravitational potential of water in the atmosphere.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stopped, there would be a decrease in thermal kinetic and an increase in gravitational potential energy.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

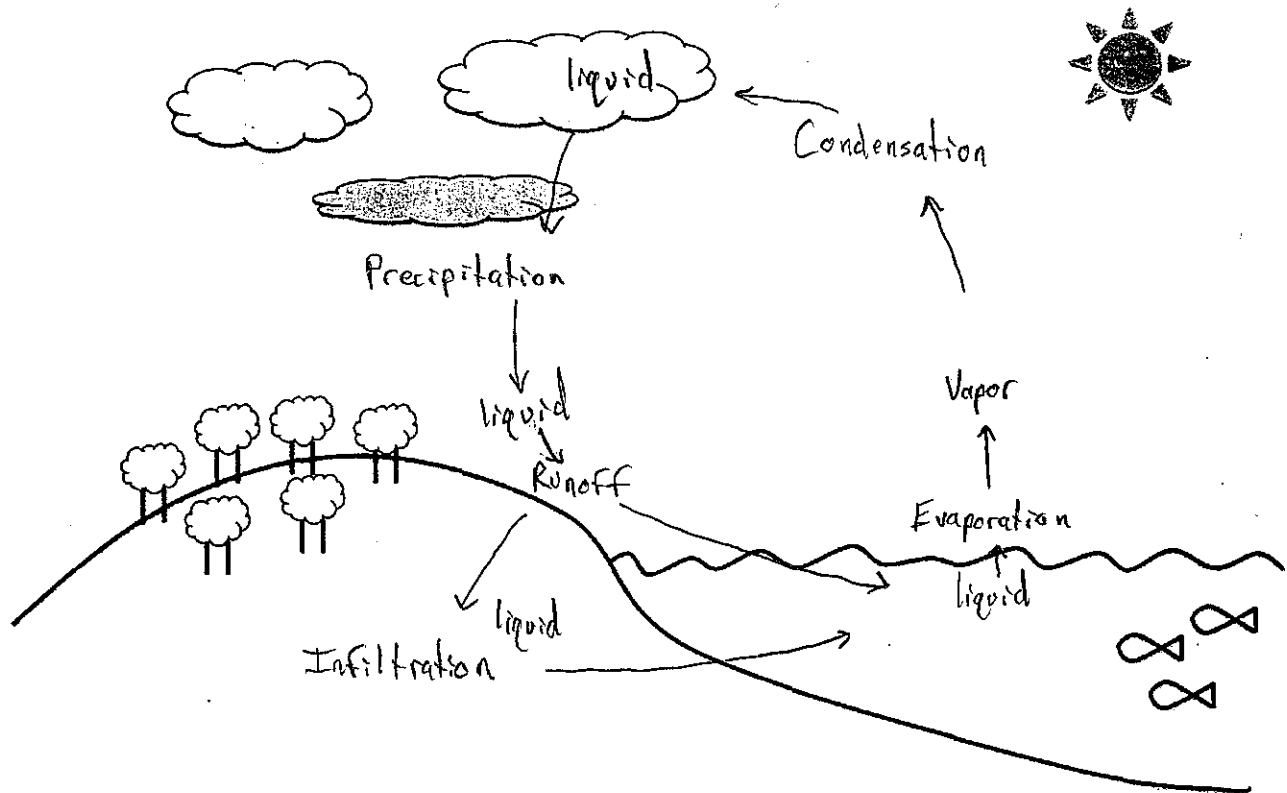
There would be an increase in gravitational kinetic energy in the water cycle, and a decrease in gravitational potential.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. Liquid water in a cloud precipitating

Gravitational potential energy \rightarrow gravitational kinetic

3. Liquid water hitting the ground

Gravitational kinetic \rightarrow gravitational potential

4. Liquid water infiltrating the ground

Gravitational potential \rightarrow gravitational kinetic

5. Liquid water running off into the lake

gravitational kinetic \rightarrow gravitational kinetic

6. Liquid water evaporating into the atmosphere

thermal kinetic \rightarrow chemical potential

A 45139440

A 40861547

A 39995552

A 40250026

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: energy stored due to its position or arrangement.

Kinetic energy: energy due to movement.

Gravitational energy: (p & k) the ability to pull or push objects of matter together or apart.

Thermal energy: (k) energy that results from movement of molecules.

Chemical energy: (p & k) energy that is due to the arrangement of atoms & molecules.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

An increase in temperature would cause a huge impact on the water cycle. Depending on location & amount of water in that area there would be more or less precipitation. Activity in condensation + evaporation would increase.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

Less Thermal Energy would decrease the amount of evaporation & condensation which would ultimately effect the amount of precipitation.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

Evaporation is a main factor in the water cycle. We believe that if evaporation were to stop, so would the rest of the water cycle.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

If the temperature of the surface water were to decrease & get colder there would be less evaporation. & less thermal energy throughout the entire water cycle which would directly effect evaporation & condensation.

13

Group: H

ISP203A – Global Change
Energy

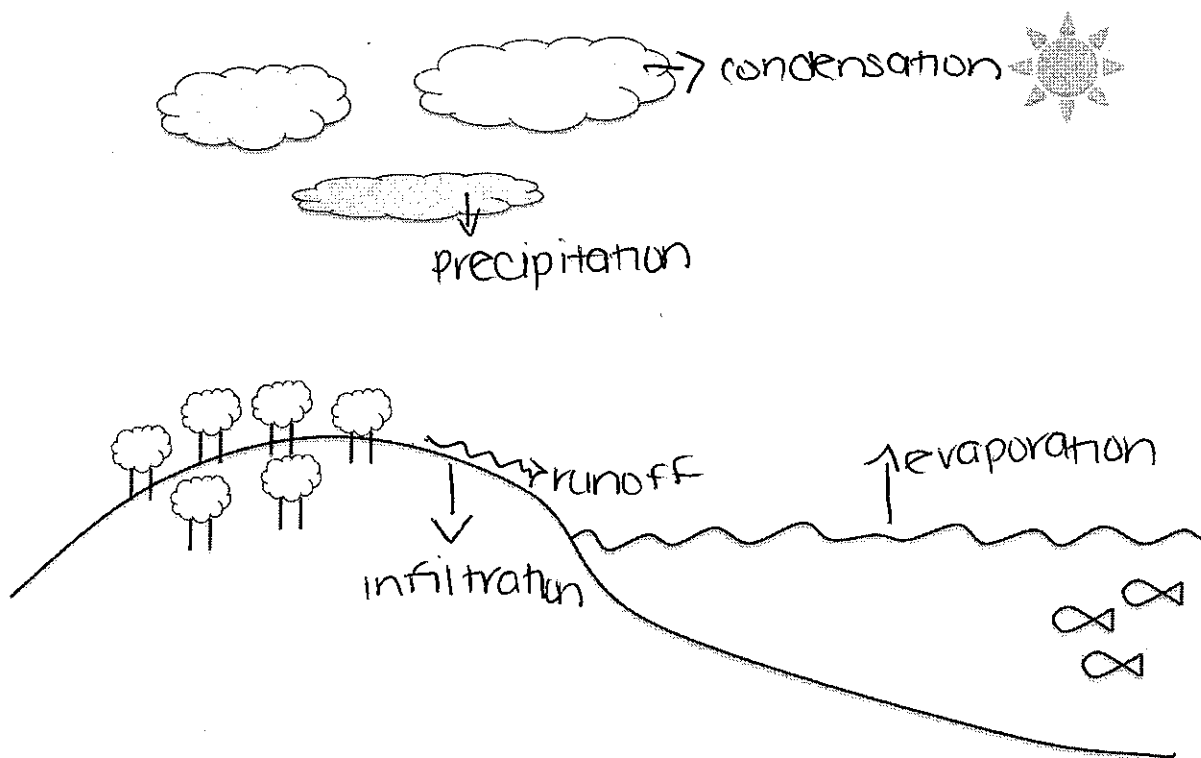
PART 2. Group Work

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. List each of these instances of water moving or phase changing below. Indicate which type(s) of energy are involved in this movement or change. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. Atmospheric liquid water precipitating to surface H_2O
(potential gravitational \rightarrow kinetic gravitational)

3. surface H_2O runoff to another surface reservoir
(gravitational potential \rightarrow kinetic gravitational)

4. surface H_2O infiltrating to ground H_2O
(gravitational potential \rightarrow kinetic gravitational)

5. liquid H_2O evaporating to atmosphere
(kinetic thermal \rightarrow potential chemical)

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: energy in motion

Gravitational energy: energy that pulls objects together through mass

Thermal energy: energy from heat

Chemical energy: energy from the breaking of bonds

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Increased evaporation, more thermal kinetic and chemical potential

Decreased condensation less residence time

Increased precipitation more thermal kinetic / chemical potential

With the increase of precipitation, there will be more movement in the water cycle creating more gravitational potential energy.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

With a decrease in thermal energy there would be less precipitation decreasing the amount of water. The rivers would be less full slowing down gravitational kinetic energy

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

Evaporation has thermal kinetic / chemical potential. Without evaporation the water cycle would be incomplete, energy would have more potential and less kinetic.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

There would be less evaporation therefore less thermal kinetic / chemical potential. As a result of this there would be less energy in the atmosphere to cycle around. kinetic / potential

cause of
extreme cold
seasonal water

Part 2: Group Work

GROUP #:

Student IDs of Members Present:

A4398190

A42235241

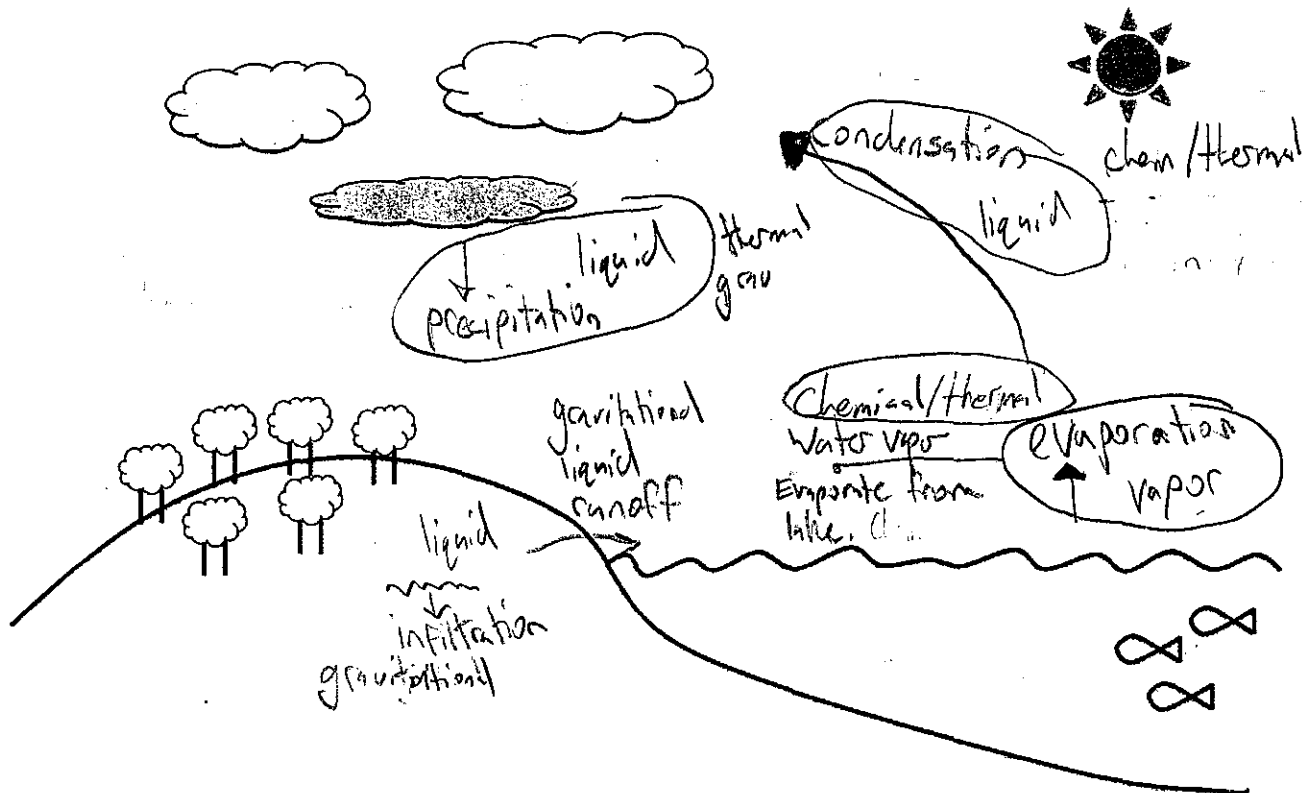
A40737921

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Evaporation → Chem potential → thermal kinetic
 Condensation → Chem potential → thermal kinetic
 precipitation → thermal potential → gravitational kinetic (falling)
 infiltration → gravitational potential → gravitational kinetic
 runoff → gravitational → gravitational kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: *Stored energy*

Kinetic energy: *energy in motion*

Gravitational energy: *energy that draws two objects together*

Thermal energy: *energy from movement of molecules.*

Chemical energy: *energy from the arrangement of atom and molecules*

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Higher temperature adds more energy so the cycle would speed up.

Evaporation would increase

Condensation would decrease

C. Imagine that there was a significant decrease in thermal energy in the atmosphere.

Describe how this might affect the gravitational potential of water in the atmosphere.

Because of the lower temperature there would be less energy in the water cycle

causing a slowdown. Evaporation would decrease

Condensation would increase

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

there wouldn't be a water cycle. I wouldn't be able to repeat itself.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

The energy goes from one process to another.

Part 2: Group Work

GROUP #: F

Student IDs of Members Present:

A42385484 A43864729

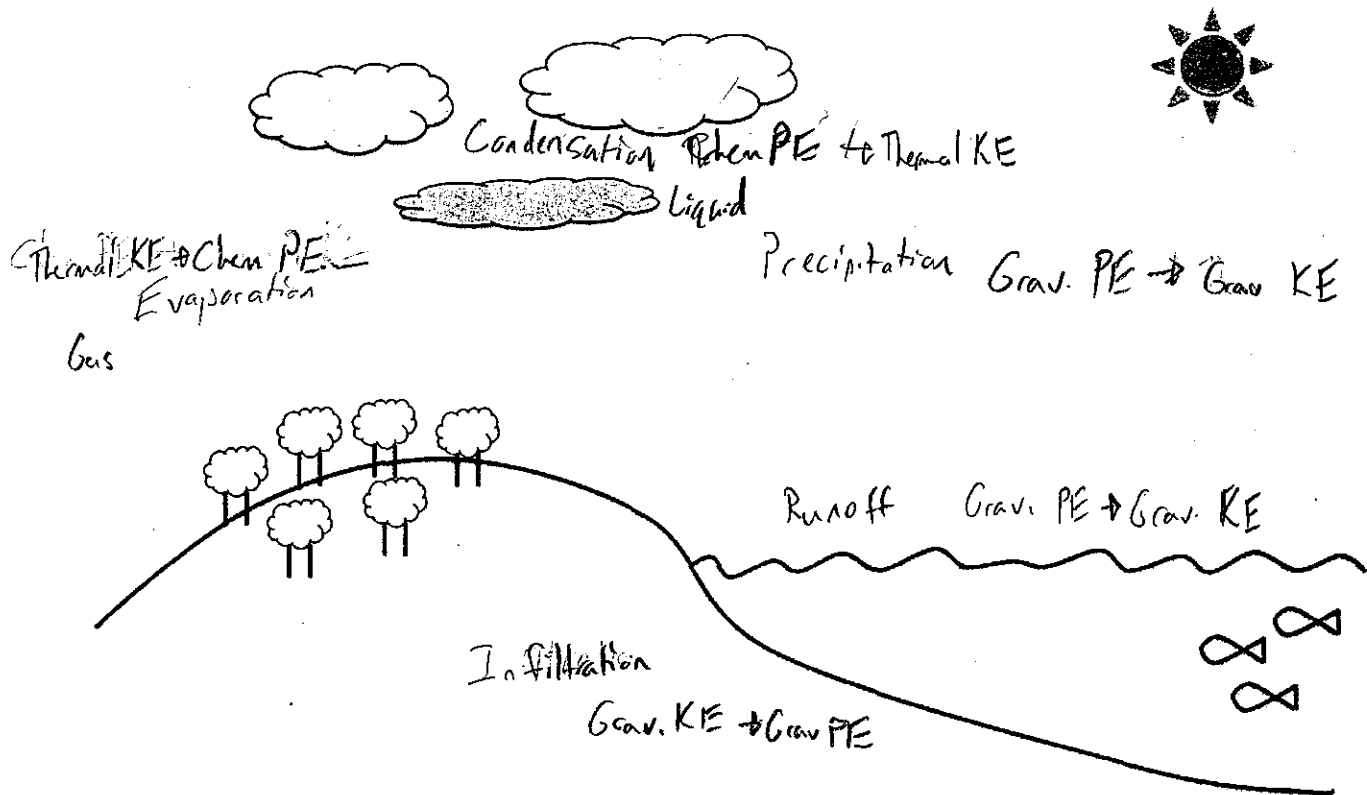
A42766836

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

Evaporation	Thermal KE \rightarrow Chem PE
Condensation	Chem PE \rightarrow Thermal KE
Precipitation	Grav. PE \rightarrow Grav. KE
Runoff	Grav. PE \rightarrow Grav. KE
Infiltration	Grav. KE \rightarrow Grav. PE

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: energy stored ~~in~~ its position depends on/or arrangement

Kinetic energy: movement causes the body to have energy

Gravitational energy: mass draws objects together

Thermal energy: movement of molecules that produces energy

Chemical energy: depends on arrangement of molecules to produce energy.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

molecules would move faster, so system would increase speed
- less condensation & more evaporation (less moisture & more dry)

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

condensation would affect precipitation level (they would be higher) & therefore, there would be more gravitational potential.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

if there's no evaporation, there is no chemical potential & can't change forms. thus, all of the other processes are affected.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

because molecules won't be moving as fast, there's less gravitational kinetic.

Part 2: Group Work

GROUP #: E

Student IDs of Members Present:

A42190700 -

A39228166 -

A41503028 -

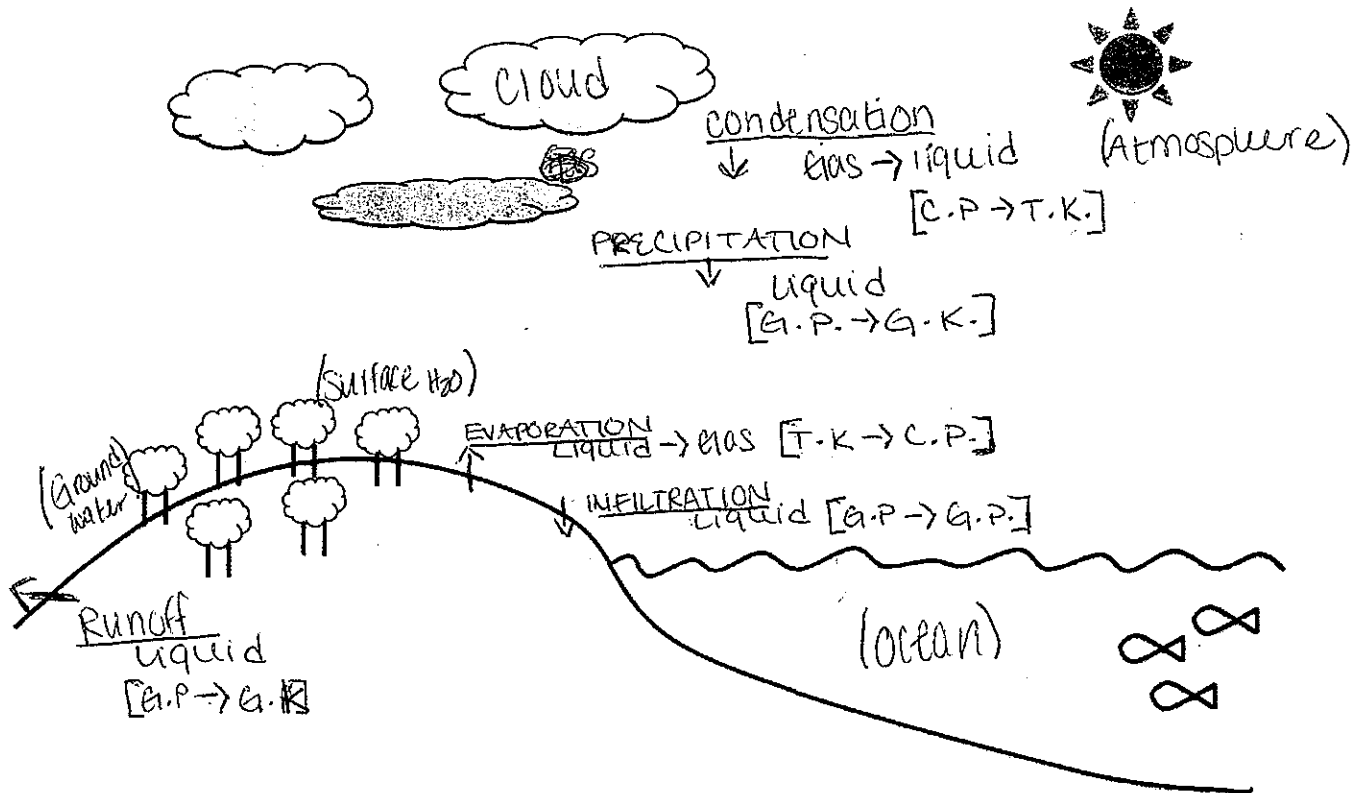
A40518651 -

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy in any object with molecules.

Kinetic energy: movement of energy & molecules

Gravitational energy: collision of two objects with mass

Thermal energy: when molecules are heated or cooled

Chemical energy: energy which results from a change in matter

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

Residence time in all reservoirs would decrease, increasing the amount of water released from each process.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

It would remain in the atmosphere longer, therefore decreasing its gravitational potential.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stopped, the entire water cycle would stop. There would be no condensation of water into the clouds, therefore no precipitation. If there's no precipitation there is no surface water for evaporation.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

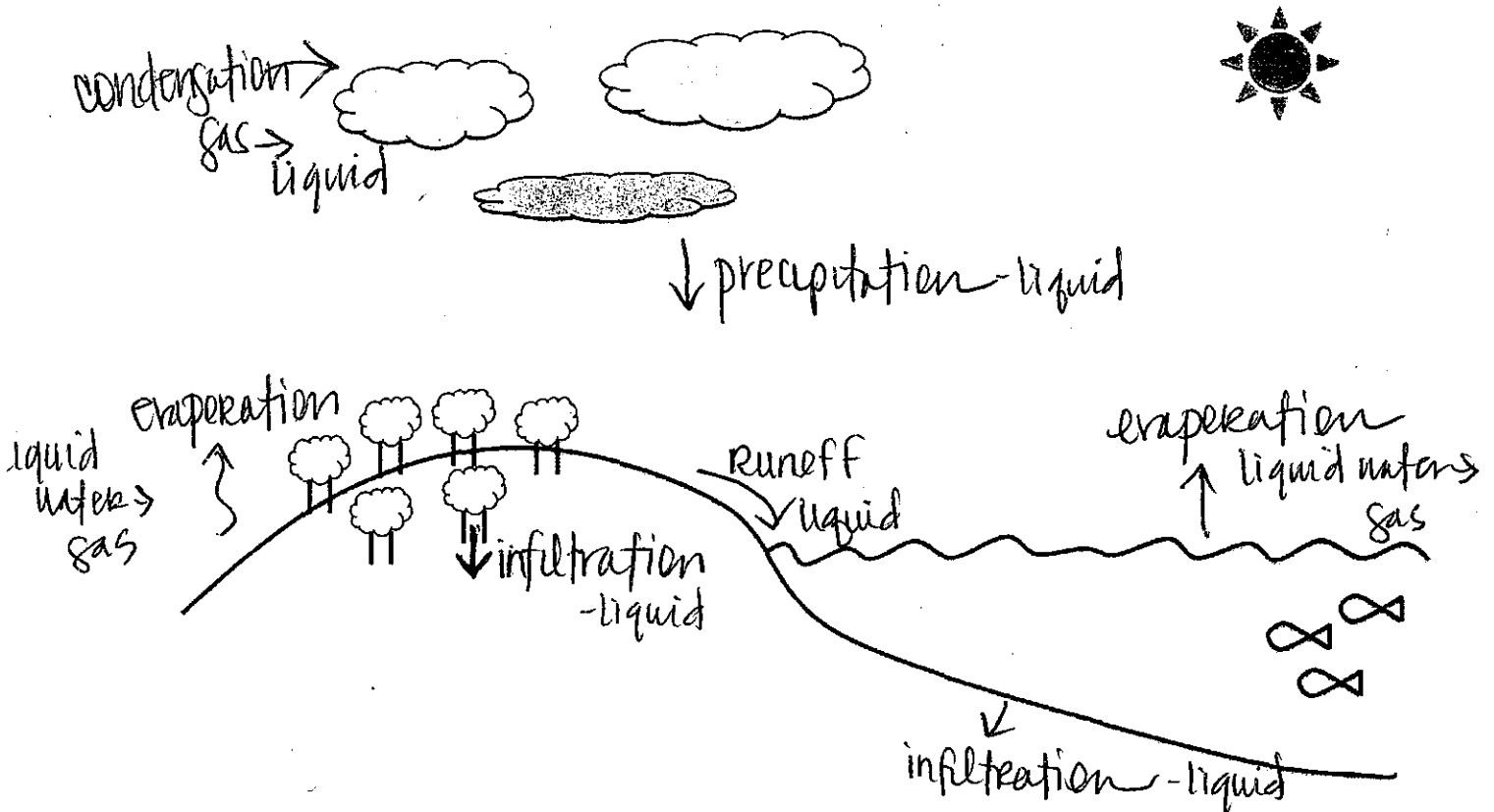
More gravitational energy and ^{more} less thermal energy. because there is more potential energy in the air for processes to occur.

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).

2. liquid ground water to gas in atmosphere = (evaporation)
thermal kinetic \rightarrow chemical potential

3. precipitation from cloud to ~~gas~~ surface water:
gravitational ~~kinetic~~ potential \rightarrow gravitational kinetic

4. infiltration / runoff from surface water to ground or ocean:
gravitational potential \rightarrow gravitational kinetic

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: *Stored energy*

Kinetic energy: *Energy of motion or movement*

Gravitational energy: *Energy that draws things together*

Thermal energy: *Energy from the movement of molecules*

Chemical energy: *Energy from the arrangement of atoms and molecules*

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

There would be a larger amount of water being evaporated, therefore you would have more chemical potential in the atmosphere.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere.

Describe how this might affect the gravitational potential of water in the atmosphere.

There would be less gravitational potential in the atmosphere because the amount of water evaporating and then condensing would be significantly less.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

If evaporation stopped, the energy in the water cycle would be reduced to being almost solely gravitational, with the exception of ice melting to liquid.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

If the surface water temperature decreased, there would be less evaporation and therefore chemical potential & thermal kinetic energy in the atmosphere.

Part 2: Group Work

GROUP #: C

Student IDs of Members Present:

A42609057-M

A42741352

A42226052

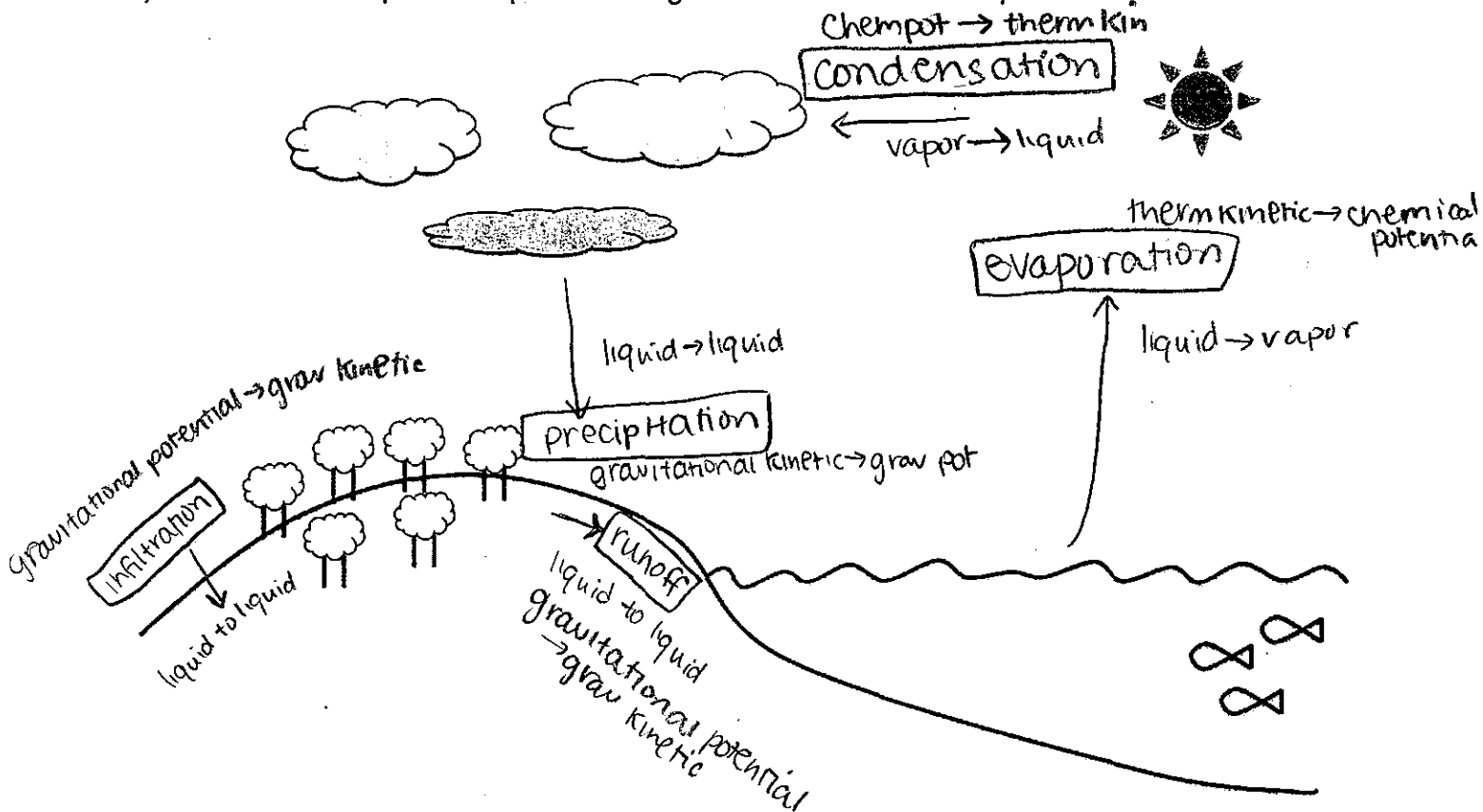
A42483118

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: stored energy

Kinetic energy: energy of motion

Gravitational energy: energy something has due to its position/place

Thermal energy: heat energy due to movement of molecules

Chemical energy: energy involving the rearrangement of molecules

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

More thermal energy would be available to be evaporated leading to more water vapor in the atmosphere. This means there would be more water available in the atmosphere to condense and form clouds.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere.

Describe how this might affect the gravitational potential of water in the atmosphere.

Less thermal energy would lead to less evaporation because the molecules of water would not be moving fast enough to transfer the liquid water into water vapor.

There would be less water vapor available to condense and form clouds leading to less precipitation. Less gravitational energy would be needed to pull water towards the surface.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

There would not be a transformation from chemical potential energy to thermal energy which occurs during condensation. Clouds would not be able to form w/out the evaporation of water and without clouds, there would be no precipitation of liquid to Earth's surface.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

If the temperature decreased, there would be less thermal energy available. The molecules in the colder water would be moving slower due to the lower temperatures and therefore there would be less evaporation/condensation.

ISP203A – Global Change, Energy
Part 2: Group Work

GROUP #: B

Student IDs of Members Present:

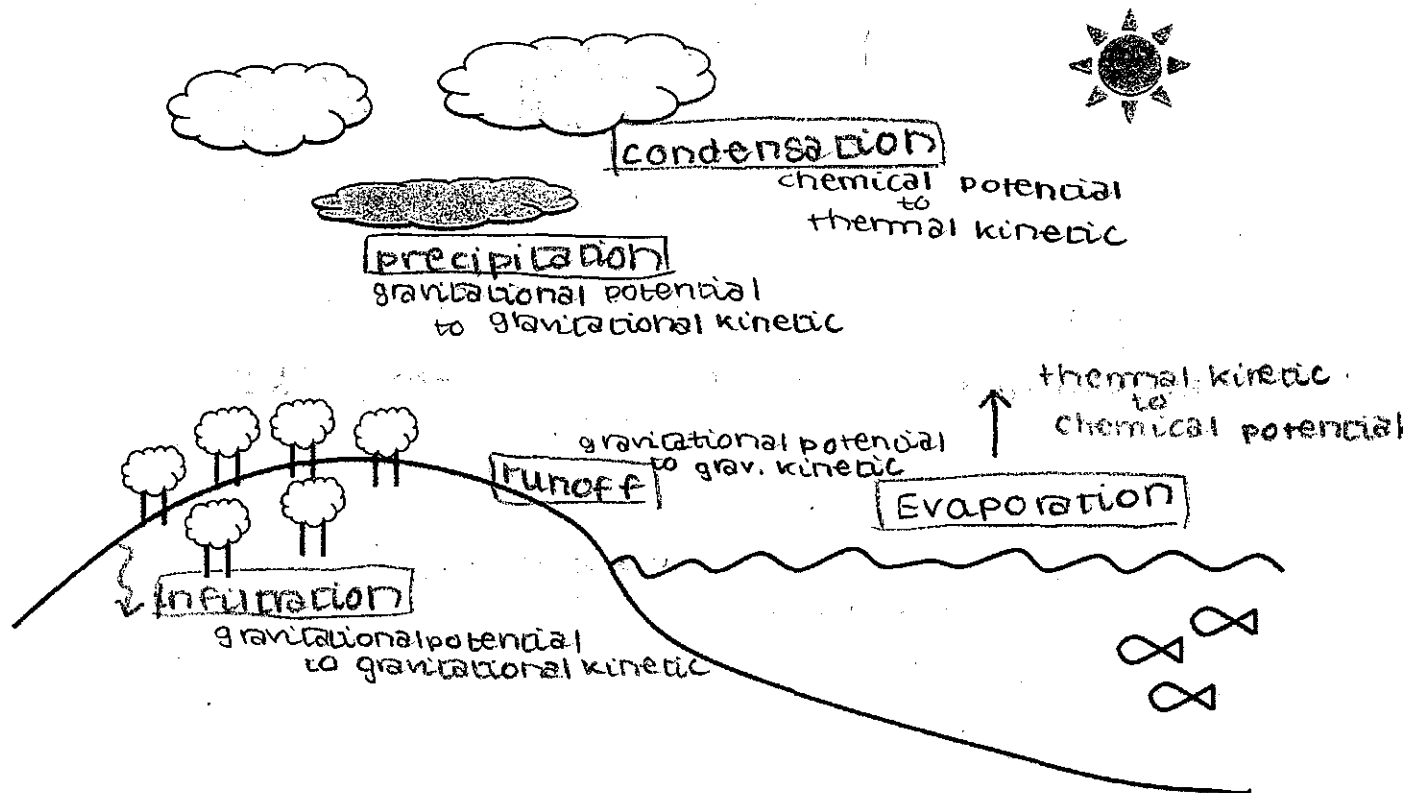
18	A4142728
	A40290629
17	A43979706
16	A39963430

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy → thermal energy (latent heat of condensation).

Part 2: Group Work

Group Questions: USE A SEPARATE SHEET AS NEEDED

A. Step back for a moment. In your group's own words, explain the following terms:

Potential energy: Energy stored due to position.

Kinetic energy: Release of energy due to movement.

Gravitational energy: Energy that draws two objects together.

Thermal energy: Energy caused by movement of molecules.

Chemical energy: The arrangement of molecules due to energy.

MAKE SURE EVERYONE UNDERSTANDS THESE TERMS BEFORE MOVING ON!

B. If global temperatures increased, how would this change the way in which energy is utilized in the water cycle? Use the water cycle diagram on the previous page to trace how an increase in thermal kinetic energy would impact the water cycle.

It would change the speed of the processes of evaporation and condensation.

C. Imagine that there was a significant decrease in thermal energy in the atmosphere. Describe how this might affect the gravitational potential of water in the atmosphere.

If the thermal energy in the atmosphere decrease, it would decrease the gravitational potential of water in the atmosphere.

D. What would happen to energy in the water cycle if evaporation stopped? This is a thought experiment that will help you test your ability to reason about energy.

This would eliminate gravitational energy in the water cycle, and this loss would have a large affect on processes including precipitation, runoff, and infiltration.

E. Imagine the temperature of surface water in Michigan decreases suddenly due to melting of glacial ice in Canada. How would this affect energy in the water cycle?

It would affect thermal energy because it is colder and there is less molecule movement. Kinetic energy would decrease b/c the molecules are not moving and vice versa for potential.

Part 2: Group Work

GROUP #: A

Student IDs of Members Present:

A41749376

A40706302

A41694022

A43573450

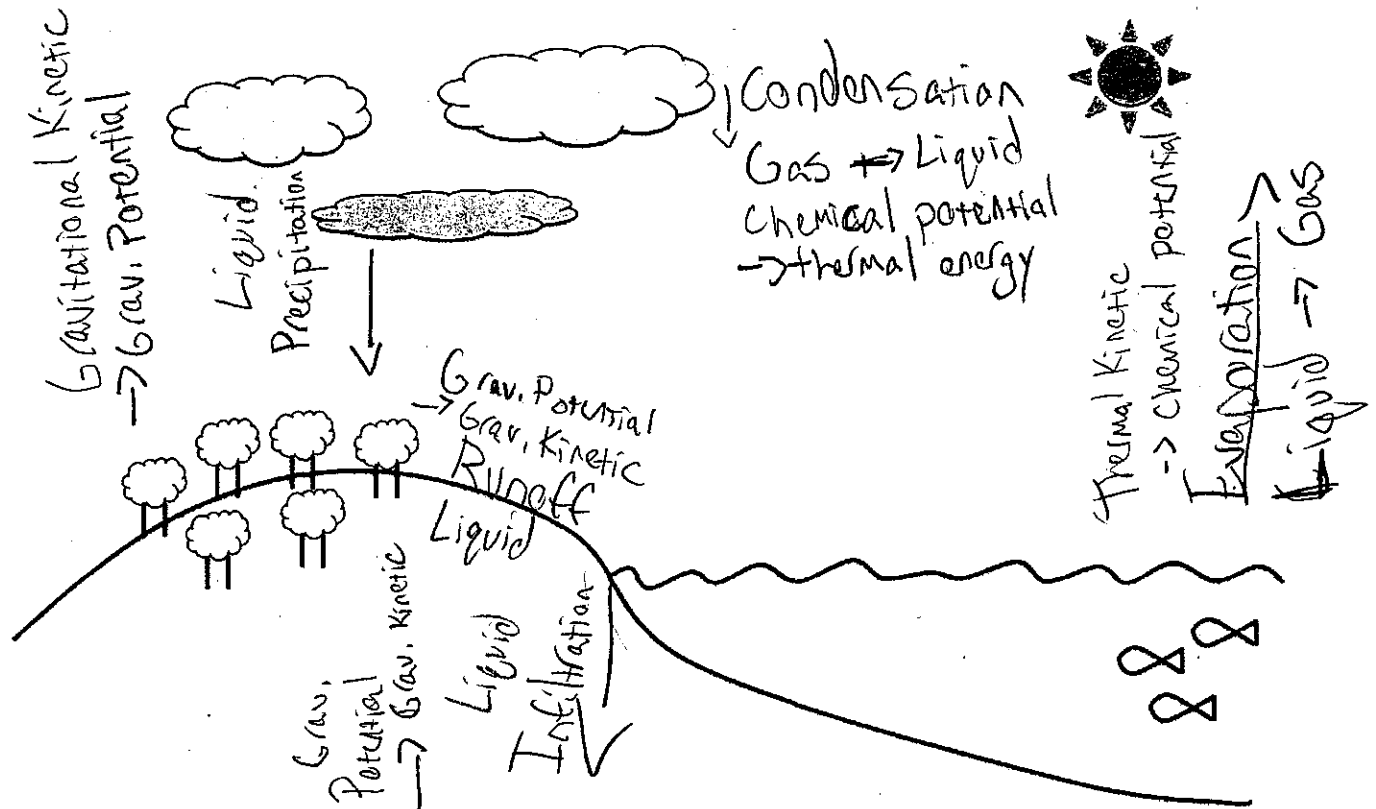
A40246326

A. As a class we reviewed water cycle processes.

1) Label these processes on the diagram below:

Evaporation, Precipitation, Runoff, Condensation, Infiltration.

2) Label the water phase or phase change associated with each process.



B. LIST EACH OF THE TYPES OF MOVEMENT OR PHASE CHANGES BELOW. Use

arrows to indicate when one type of energy is transforming into another. For example:

1. Water vapor turning into a cloud.

Chemical potential energy \rightarrow thermal energy (latent heat of condensation).